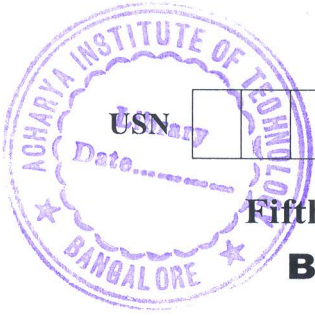


# CBCS SCHEME



15BT563

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

## Biotechnology for Sustainable Environment

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Describe the various uses of water. (08 Marks)
- b. Discuss the preliminary wastewater treatment systems. (06 Marks)
- c. A 350 mm diameter sewer is to flow at 0.35 m depth at certain grade with velocity of 0.8 m/s. Find the required grade and discharge rate at this depth. Assume Manning's rugosity coefficient as 0.014. (02 Marks)

OR

- 2 a. Elaborate the concept of BOD. (08 Marks)
- b. Highlight the water consumption standards. (03 Marks)
- c. The 5 day 30°C BOD of wastewater sample is found as 110 mg/l. Calculate its 5 days 20°C BOD. Assume  $K_D$  at 20°C is 0.1. (05 Marks)

### Module-2

- 3 a. Elaborate the aerobic attached growth processes in detail. (08 Marks)
- b. Discuss the stages of anaerobic digestion process. (08 Marks)

OR

- 4 a. Examine the sludge thickening processes in detail. (08 Marks)
- b. Describe the methods of sludge disposal on land. (08 Marks)

### Module-3

- 5 a. Highlight the various classifications of air pollutants. (08 Marks)
- b. Elaborate the effects of air pollutants on human health. (08 Marks)

OR

- 6 a. Discuss the settling chambers and cyclones used for collecting particulates. (08 Marks)
- b. Elaborate the sources of noise in detail. (08 Marks)

### Module-4

- 7 a. Distinguish between renewable and non-renewable sources of energy with suitable examples. (08 Marks)
- b. Examine the production of biodiesel from Jatropha and Pongamia. (08 Marks)

OR

- 8 a. Elaborate the biotechnological inputs in producing good quality natural fibres. (08 Marks)
- b. Discuss the production of fuel and oil from wood wastes. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**Module-5**

- 9 a. Discuss the physical properties of solid wastes. (08 Marks)  
 b. Estimate the moisture content of 100 kg solid waste sample with the following composition.

Component	Percent by Mass	Moisture Content (%)
Food waste	15	70
Paper	45	6
Cardboard	10	5
Plastics	10	2
Garden trimmings	10	60
Wood	5	20
Tin cans	5	3

(08 Marks)

**OR**

- 10 a. Describe the process for handling of hazardous wastes from bioprocess industries. (08 Marks)  
 b. Estimate the energy content of 100 kg solid waste sample with composition given below. What is the energy content on (i) dry basis and (ii) ash free dry basis? Assume ash content is 5% and moisture content is 21%.

Component	Percent by mass	Energy (kJ/kg)
Food waste	15	4,650
Paper	45	16,750
Cardboard	10	16,300
Plastics	10	32,600
Garden trimmings	10	6,500
Wood	5	18,600
Tin cans	5	700

(08 Marks)

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